PARTICULATE MATTER
MONITORING NETWORK DESCRIPTION
FOR SAN JOAQUIN VALLEY AIR BASIN
MONITORING PLANNING AREA

PREPARED BY

San Joaquin Valley Unified Air Pollution Control District

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1.0 INTRODUCTION

This document is the PM2.5 Monitoring Network Plan for the entire San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD). This plan will describe the location and reasoning of each of the eleven (11) required PM2.5 monitors that are to be located in the SJVUAPCD. It also contains an overview of the general characteristics of the SJVUAPCD.

1.1 Physical Setting

The San Joaquin Valley is a major geographic, population, and agricultural subregion of California. The SJVUAPCD, and the corresponding air basin (SJVAB), includes the counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the Valley portion of Kern County. Comprising nearly 25,000 square miles, it represents approximately 16% of the geographic area of California.

The SJVAB consists of a continuous inter-mountain valley approximately 250 miles long and averaging 80 miles wide. On the western edge is the Coast Mountain range, with peaks reaching 5,020 feet, and on the east side of the Valley is the Sierra Nevada range with some peaks exceeding 14,000 feet. The Tehachapi Mountains form the southern boundary of the Valley. This mountain range includes peaks over 6,000 feet, and contains mountain passes to the Los Angeles basin and the Mojave Desert.

The SJVAB is predominately agriculturally oriented, including foothill and mountain areas devoted to grazing and timber sales. Two large irrigation delivery systems, the Central Valley Project and the California Water Development Project, have increased irrigated agricultural acreage and agricultural production. These projects have made surface water available to the west side of the Valley, in addition to other areas of the SJVUAPCD already receiving surface water.

Approximately 31 percent of the total land area within the SJVUAPCD is under public ownership. The federal government is the largest public land holder with approximately 94 percent of the total public-owned land under its jurisdiction. For the most part, the holdings consist of National Forest lands, National Parks, wildlife refuge areas, plus a major military air base located on the Valley floor.

1.2 Population Characteristics

The San Joaquin Valley has a population of over three million people, which is approximately 9.6 percent of the state's population. One third of the population is concentrated in the major urban centers of Bakersfield, Fresno, Merced, Modesto, Stockton and Visalia. The counties with the largest population are Fresno, Kern, and San Joaquin. The least populous counties are Kings and Madera. As a result of relatively inexpensive land, and its location between the San Francisco Bay Area and Southern California, the Valley has experienced large inter-regional population shifts.

The SJVUAPCD's population has been growing rapidly. The most recent published estimates of population levels (1996) and population projections (2000 and 2010) within the SJVAB as provided by the California Department of Finance are shown in Table 1.2.1. The SJVUAPCD's population is projected to increase by approximately 22 percent by the year 2000. This projected growth of 673,160 persons represents more persons than the current individual populations of each of the SJVUAPCD counties, except for Fresno County.

Table 1.2.1 San Joaquin Valley SJVAB Population and Land

County	1996[1]	2000 Projection[2]	% Change[3]	2010 Projection[2]	% Change[3]	Land Area[4]
Fresno	760,900	945,900	24.3%	1,237,400	62.6%	5,968
Kern[5]	518,500	665,660	28.4%	861,290	66.1%	5,584
Kings	118,900	135,200	13.7%	168,900	42.1%	1,396
Madera	108,900	134,000	23.1%	171,800	57.8%	2,145
Merced	198,500	239,000	20.4%	313,600	58.0%	1,981
San Joaquin	529,300	620,300	17.2%	778,400	47.1%	1,414
Stanislaus	415,300	517,600	24.6%	670,000	61.3%	1,511
Tulare	351,500	417,300	18.7%	521,200	48.3%	4,844
Total	3,001,800	3,674,960	22.4%	4,722,590	57.3%	24,843

[1] As of January 1, 1996. State Department of Finance, Demographic Research Unit, Population Estimates for California Cities and Counties, Report 96 E-1, May 1996.
[2] State Department of Finance, Demographic Research Unit, Official Population Projections, Report 93 P-1, April 1993.
[3] Percent change from the 1996 population figure.
[4] Area in square miles.
[5] Populations/figures reflect a 17% population reduction to account for the portion of Kern County outside of the air basin.

The Metropolitan Statistical Areas (MSAs) in the Valley with population levels above 200,000 in 1990 requiring PM2.5 monitors are Bakersfield, Fresno, Modesto, Stockton-Lodi, and Visalia-Tulare-Porterville.

1.3 Climate and Weather

The San Joaquin Valley is a continuous inter-mountain valley with dimensions of approximately 250 miles in length and 80 miles in width. Climatologically, the summer weather pattern for the San Joaquin Valley is dominated by a semi-permanent, sub-tropical high pressure area that covers the eastern Pacific and the majority of California. The Valley is characterized by rainfall of between five and fifteen inches per year, most of which occurs during the winter season, and hot summers where temperatures above forty degrees Celsius are common and wind flow is light and variable.

In the winter season, frontal systems and troughs spawned in the northern Pacific Ocean bring clouds and rain into the San Joaquin Valley. These systems are generally produced from low pressure areas in the Pacific from several hundred to several thousand miles northwest of the Valley. These weather systems are often followed by periods of atmospheric instability which result in increased vertical motion of the atmosphere leading to good air quality. Frequently, however, periods of poor dispersion occur during the Valley winter when troughs and frontal systems are pushed northward by high pressure systems. Dispersion lessens and air quality worsens as winds become light and strong inversions form.

The presence of the subsidence inversion and the light transport winds are meteorological conditions conducive to the formation and accumulation of PM2.5. The major point sources of PM2.5 and its precursor emissions are located throughout the SJVUAPCD, but primarily in the major metropolitan areas of Stockton, Modesto, Merced, Fresno, Visalia, and Bakersfield, where high population density, industry, and the majority of vehicular travel exist. Additional emissions sources are located in Sacramento and the urbanized Bay Area.

Typically, the net northwesterly wind flow produces the effect of having northern Valley and out-of SJVUAPCD sources impact receptor areas in the southern portion of the Valley. Emissions originating in these areas are transported under the subsidence inversion layer with the wind flow from northwest to southeast where the ozone concentrations are highest.

1.4 Dominant Economic Activities and Emission Sources

The San Joaquin Valley is an exceptionally rich agricultural area, containing more than 4.2 million acres of irrigated land with more than 240 types of crops being grown. Therefore, crop production, livestock production, and related agricultural services are prevalent throughout the Valley. Much of the industry in the Valley is directly or indirectly related to providing services, products and support to those agricultural operations. Food production and processing have historically also been important industries in the Valley. In addition, the SJVUAPCD has a substantial petroleum industry (oil production and refining), predominantly in Kern County in the southern portion of the Valley. As the population grows, other sectors of the economy continue to grow. These include the construction industry, service industries (such as health and business services), government (including universities, prisons, and a military base), and trade and finance industries. Regional distribution centers are increasingly located throughout the Valley because of the centralized location.

Various activities contribute to emissions of PM2.5. PM2.5 can be formed through chemical interactions from directly emitted precursor pollutants, such as oxides of sulfur (SOx), oxides of nitrogen (NOx), volatile organic compounds (VOCs), and ammonia. Emission sources of VOCs include oil and gas production and storage, various coatings operations, and the operation of motor vehicles. Emissions of another precursor pollutant, NOx, result from internal and external combustion, such as in boilers and steam generators used in diverse industries. PM2.5 can also be directly emitted in the form of geologic dust and from tire wear and combustion.

1.5 PM2.5 Monitoring Requirements

According to the PM2.5 regulations, two Core State and Local Air Monitoring Stations (SLAMS) samplers are needed in an MSA with a population greater than 500,000, and one Core SLAMS sampler is needed in an MSA with a population between 200,000 and 500,000. In addition, one Core SLAMS sampler is needed in each Photochemical Assessment Monitoring Station (PAMS) area of which the SJVUAPCD has two.

Based on this information and 1990 census figures, the SJVUAPCD will be required to initiate three PM2.5 Core SLAMS samplers in the Fresno MSA, three Core SLAMS samplers in the Bakersfield MSA, one Core SLAMS sampler in the Stockton-Lodi MSA, one Core SLAMS sampler in the Modesto MSA, and one Core SLAMS sampler in the Visalia-Tulare-Porterville MSA for a total of nine Core SLAMS samplers.

One or two additional monitors are required to be located within the SJVAB based on an additional 300,000 people living in areas within the SJVUAPCD that do not meet core monitor requirements. The SJVUAPCD is proposing two additional monitors. The first will be located in Merced County. The current population for Merced is over 200,000 and the requirement for a PM2.5 monitor will be triggered in 2000. The second will be located in the City of Corcoran in Kings County which has measured PM2.5 values with a non-FRM instrument that exceed the PM2.5 NAAQS. This information is summarized in Table 1.5.1

Table 1.5.1 Summary of PM2.5 Monitoring Requirements

MSA/County	1990 Population	Core > 200,000	Core > 500,000	PAMS	Other Core	Total
Bakersfield	544,981*		2	1		3
Fresno	755,580		2	1		3
Modesto	370,522	1				1
Stockton-Lodi	480,628	1				1
Visalia-Tulare-Porterville	311,921	1				1
Merced	178,403				1	1
Kings	101,469				1	1
Total	2,743,504	3	4	2	2	11

*The population is for the entire MSA. This MSA is split between the SJVUAPCD and the Kern County Air Pollution Control District. All PM2.5 monitors listed in this table are located within the SJVUAPCD.

2.0 PM2.5 MONITORING NETWORK ELEMENTS

Several types of PM2.5 monitors will be part of the PM2.5 monitoring network. This section summarizes the PM2.5 monitors: 1) planned for deployment in 1998 and 1999; and 2) existing particulate matter monitors at the PM2.5 sites. For a summary of particulate matter monitoring outside of the PM2.5 monitoring network, please refer to the statewide summary.

2.1 PM2.5 Monitors Planned for Deployment

The most important objective of the PM2.5 monitoring program is developing a data base for comparison to the annual average and 24 hour-average PM2.5 NAAQS. The Federal Reference Monitors (FRM) will collect mass measurements to support area designations such as attainment or nonattainment. Other monitoring instruments including continuous analyzers and speciation samplers will provide temporally resolved data or full chemical characterization of PM2.5 data. This information is summarized in Table 2.1.1.

Table 2.1.1 PM2.5 Monitoring Network

Site Location	AIRS Site ID	PM2.5 FRM*	PM2.5 Speciation*	PM2.5 TEOM/BAM*	Other PM2.5 Monitors (Specify)
Bakersfield-1128 Golden State	060290010	XX	S		
Bakersfield-5558 California Avenue	060290014	X	S		Dichot, Dry Deposition
Bakersfield-"Southeast"	New ID	Z			
Clovis-N Villa Avenue	060195001	X	S		
Corcoran-Patterson Avenue	060310004	X	S		Dichot
Fresno-1st Street	060190008	XX	S		Dichot
Fresno-"Southeast"	New ID	Z			
Merced-"Mid-Town"	New ID	X	S		
Modesto-I Street	060990002	X	S		Dichot
Stockton-Hazelton Street	060771002	X	S		Dichot
Taft College	060292004				Dichot
Visalia-N Church Street	061072002	X	S		Dichot

*Codes:

X - Monitor to be deployed in 1998
Z - Monitor to be deployed in 1999
XX- Collocated particulate monitors used for precision data to be deployed in 1998
YY- Collocated particulate monitors used for precision data to be deployed in 1999
S - Site Proposed for collecting speciated PM2.5 data

2.2 Existing Particulate Matter Monitors

The SJVUAPCD operates an extensive PM10 monitoring network throughout the SJVAB. A summary of the network is shown on Table 2.2.1. This network consists of a variety of PM10 monitors such as SSI, Dichot, COH, and Neph. For a summary of particulate matter monitoring outside of the PM10 monitoring network in this SJVUAPCD, please refer to the statewide summary.

Table 2.2.1 Existing Particulate Matter Monitors

Site Location	AIRS Site ID	Dichot[1]	PM10 SSI[1]	PM10 TEOM/BAM[1]	Other Particulate Matter Monitors (Specify)
Clovis-N Villa Avenue*	060195001		X	X	
Fresno-Drummond	060190007		X		
Fresno-1st Street*	060190008	X	XX	X	COH
Bakersfield-1128 Golden State*	060290010		X		
Bakersfield-5558 California Avenue*	060290014	X	XX	X	COH, Neph
Oildale-Manor Street	060290232		X		COH, Neph
Taft College	060292004	X	XX		
Corcoran-Patterson Avenue*	060310004	X	XX	X	
Hanford-South Irwin Street	060311004		X		
Stockton-Hazelton Street*	060771002	X	X	X	COH, Neph
Stockton-Wagner/Holt	060773010		X		
Modesto-I Street*	060990002	X	X		
Modesto-814 14th Street	060990005			X	COH, Neph
Turlock-900 South Minaret Street	060990006		X		
Visalia- North Church Street*	061072002	X	X		COH

[1]Codes:

X- Existing monitor
XX- Collocated particulate matter monitor used for precision data
COH- AISI Tape Sampler for Soiling Index (Coefficient of Haze)
Neph- Light Scatter (Nephelometer)
* - Monitoring sites that will include PM2.5 monitors

2.3 PM2.5 Quality Assurance

The SJVUAPCD will adopt the quality assurance plan that is developed by ARB. For more information on ARB's quality assurance plan, please refer to the quality assurance section in the statewide portion of this plan.

2.4 Laboratory Analyses

Samples that are collected from sites in San Joaquin, Stanislaus, Merced, Madera, and Fresno Counties will be weighed at the ARB labs. Samples collected in Kings, Tulare and Kern Counties will be weighed at the Ventura County Air Pollution Control District's labs. Samples collected from the speciation monitors will be analyzed through a network of 1-3 central contract laboratories in the country. The names of the contract laboratories are yet to be determined.

3.0 PM2.5 MONITORING SITES TO BE DEPLOYED IN 1998

The SJVUAPCD is planning to deploy nine PM2.5 monitoring sites in 1998. This section defines why these sites were selected to monitor for PM2.5. The selected sites, along with the more important parameters that characterize each site, are described below.

3.1 Monitor Siting

To simplify the description of the nine monitoring sites, general descriptions of the Bakersfield, Fresno, Modesto, Stockton-Lodi, Visalia-Tulare-Porterville MSAs, and the remaining other sites are provided as subsections. Each general description is then followed by a discussion of each site within that MSA.

3.1.1 Bakersfield MSA

The Bakersfield MSA is located on the southern most edge of the San Joaquin Valley and is divided between the SJVUAPCD and the Kern County Air Pollution Control District. The boundaries of the MSA and Kern County are the same. The 1990 total population of the MSA was 544,981 with approximately 447,400 people residing in the SJVUAPCD portion. In fall and winter, days are cool to cold with inversions less than 50 meters. These low temperatures and inversions lead to the formation of fog in the winter time. Typically, the SJVUAPCD portion of this MSA receives five inches of rain per year.

3.1.1.1 Bakersfield-1128 Golden State

This site is located in the northwest quadrant of the City of Bakersfield, meets EPA's urban city center definition, and is a PAMS type II site. This is a neighborhood scale site. Although the land use immediately around this site is commercial and light industrial, the predominate land use within four kilometers is residential. There are two major streets nearby, Golden State Avenue, with 30,300 trips per day, and Freeway 178.

A special purpose study (IMS95) indicates that this site is in an area of representative concentration.

3.1.1.2 Bakersfield-5558 California Avenue

This site is centrally located in the western part of the City of Bakersfield. It meets EPA's central city definition. The scale of this site is being revised from middle scale to neighborhood scale. A school and general heavy commercial uses are adjacent to or immediately surround the site. The predominate land use within four kilometers, however, is residential. A golf course is also located within this radius. There are two arterials nearby, California Avenue and Stockdale Highway.

A special purpose study (IMS95) shows that this site is in an area of maximum concentration, with the maximum concentration occurring 80 percent of the time. This is the maximum concentration site for this MSA.

3.1.2 Fresno MSA

The Fresno MSA, consisting of Fresno and Madera Counties, is located in the central part of the San Joaquin Valley. The 1990 total population of the MSA is 755,580. In fall and winter, days are cool to cold with inversions less than 50 meters. The low temperatures and inversions lead to the formation of fog in the winter time. Typically, this MSA receives ten inches of rain per year.

3.1.2.1 Clovis-N Villa Avenue

This site is located in the northeast quadrant of the City of Clovis and meets EPA's suburban definition. This is a neighborhood scale site. Although the predominate land use within four kilometers is residential and agricultural, land use immediately around the site is residential and a neighborhood park. Ponding basins and canals are also located in the area. Two major streets, Villa Avenue, with 17,000 trips per day, and Barstow Avenue, are located nearby. Many other arterial streets, such as Shaw Avenue to the south, are also located in the site's vicinity.

This is a PAMS site. A special purpose study (IMS95) shows that this site is in an area of representative concentration.

3.1.2.2 Fresno-1st Street

This site is centrally located close to the geographical center of the City of Fresno and meets EPA's central city definition. This is a neighborhood scale site. Although the predominate land use within four kilometers of this site is residential, the land use immediately around the site is general heavy commercial and residential. Hospitals are located about one mile to the north and 1.5 miles to the northeast. Two arterial streets, First Street and Shields Avenue, are located in the site's vicinity.

A special purpose study (IMS95) shows that this site is in an area of maximum concentration. This study indicates that this site or a temporary site nearby had the maximum concentration 80 percent of the time for this MSA. This is the maximum concentration site for this MSA.

3.1.3 Modesto MSA

The Modesto MSA is located in the northern part of the San Joaquin Valley. The boundaries of the MSA follow the boundaries of Stanislaus County. The total 1990 population of the MSA is 370,522. In fall and winter, days are cool to cold with inversions less than 50 meters. The low temperatures and inversions lead to the formation of fog in the winter time. Typically, this MSA receives about fifteen inches of rain per year. The wind in the northern part of the SJVUAPCD tends to be a little stronger (1-2 meters per second higher) than in the central and southern areas.

3.1.3.1 Modesto-I Street

This site is located in the downtown section of the City of Modesto and meets EPA's central city definition. This is a neighborhood scale site. The area within four kilometers of this site can be best described as mixed use, with land use immediately around this site being office (primarily government) and light commercial. Freeway 99 is located about one mile to the southwest.

This site was chosen because it has the only PM10 monitor in the City of Modesto, and the City has the largest population in the MSA. The only other PM10 monitor in this MSA is located in Turlock.

3.1.4 Stockton-Lodi MSA

The Stockton MSA is located on the northern edge of the San Joaquin Valley. The boundaries of the MSA and San Joaquin County are identical. The total population of the MSA is 480,628. In fall and winter, days are cool to cold with inversions less than 50 meters. The low temperatures and inversions lead to the formation of fog in the winter time. Typically, this MSA receives about fifteen inches of rain per year. The wind tends to be a little stronger (1-2 meters per second higher) in the northern part of the SJVUAPCD than in the central and southern areas.

3.1.4.1 Stockton-Hazelton Street

This site is located in the downtown section of the City of Stockton and meets EPA's central city definition. This is a neighborhood scale site. The area within four kilometers of this site can be best described as mixed use, with the land use immediately around this site being residential and light commercial. A railroad yard and a sea port are located south and west, respectively, of the site. Freeway 99 is located east of the site, Freeway 4 to its south and Interstate 5 to its west.

The site was chosen because it has one of the two PM10 monitors in the City of Stockton, and is more centrally located than the other site. Also, the City has the largest population in the MSA.

3.1.5 Visalia-Tulare-Porterville MSA

The Visalia-Tulare-Porterville MSA is located in the southern part of the San Joaquin Valley. The boundaries of the MSA and Tulare County coincide. The total population of the MSA is 311,921. In fall and winter, days are cool to cold with inversions less than 50 meters. The low temperatures and inversions lead to the formation of fog in the winter time. Typically, this MSA receives about five inches of rain per year.

3.1.5.1 Visalia-N Church Street

This site is located in the downtown section of the City of Visalia and meets EPA's central city definition. This is a neighborhood scale site. Land use within four kilometers and immediately around the site can be best described as mixed use, equally split between residential and light commercial. Highway 198 is located to the site's south.

This site was chosen because it has the only PM10 monitoring site in the MSA, and the City has the largest urban population in the MSA.

3.1.6 Other Sites

The Merced MSA and Kings County are two other areas in which the SJVUAPCD is proposing to locate sites. The Merced MSA is defined as Merced County and has a population of 178,403. Kings County has a population of 101,469. The climate for the Merced MSA is similar to that of Modesto MSA. The climate for Kings County is similar to the Bakersfield and Visalia-Tulare-Porterville MSA. The reasons for installing the monitors at these locations are explained in the following subsections.

3.1.6.1 Corcoran-Patterson Avenue

The Corcoran area is known to have high readings of both PM10 and PM2.5 and thus was selected for a monitoring site. The site will be located at the existing PM10 site at a school on Patterson Avenue in the City of Corcoran. Corcoran is located almost on the Kings and Tulare Counties border. The predominate land use in the area is agricultural, while land use in the immediate area is residential. A hospital is located about three blocks from the site. Highway 43 is about one-third mile to the northeast.

3.1.6.2 Merced-"Mid-Town"

The Merced "Mid-Town" site was selected for two reasons. Since 1990, the population in the Merced MSA has increased and now exceeds 201,000. A new monitor, therefore, will be required when the 2000 census is taken. Another reason is to provide for adequate coverage. By placing a monitor here, every major city along Freeway 99 will have a monitor. This will be a new site, and the specific land use is not yet known. It will, however, be sited in accordance with the requirements of a PM2.5 monitoring site. In order to make full use of the PM2.5 data collected at this site, full meteorological monitoring equipment will also need to be installed.

3.2 Site Description

The SJVUAPCD plans to locate nine PM2.5 monitoring sites in 1998. Each site will operate a FRM monitor purchased through national contracts. The preferred monitor is an FRM Sequential Monitor. Each PM2.5 site located in the SJVUAPCD will be a core-SLAMS site. Data from all sites can be compared to both the annual average standard and the 24-hour standard because each site is in a population-oriented location and has a neighborhood scale. This information is summarized in Table 3.2.1. Refer to Section 3.1 for a description of activities surrounding each site.

Table 3.2.1 PM2.5 Monitoring Sites to be Deployed in 1998

Site Location	AIRS Site ID	Operating Agency[1]	Spatial Scale	Monitoring Objective[2]	Site Type[3]	Measurement Method
Bakersfield-1128 Golden State	060290010	SJV	Neighborhood	R, P	C	FRM Sequential
Bakersfield-5558 California Avenue	060290014	ARB	Neighborhood	M, HS	C	FRM Sequential
Clovis-N Villa Avenue	060195001	SJV	Neighborhood	R, P	C	FRM Sequential
Corcoran-Patterson Avenue	060310004	SJV	Neighborhood	M	C	FRM Sequential
Fresno-1st Street	060190008	ARB	Neighborhood	M, HS	C	FRM Sequential
Merced-"Mid-Town"	New ID	SJV	Neighborhood	M	C	FRM Sequential
Modesto-I Street	060990002	ARB	Neighborhood	M, HS	C	FRM Sequential
Stockton-Hazelton Street	060771002	ARB	Neighborhood	M, HS	C	FRM Sequential
Visalia-N Church Street	061072002	ARB	Neighborhood	M, HS	C	FRM Sequential

[1]**Operating Agency:** ARB - California Air Resources Board
SJV - San Joaquin Valley Unified Air Pollution Control District

[2]**Monitoring Objectives:**
R - To determine representative high concentrations in a populated area.
M - To determine the highest concentration expected to occur in the area covered by the network (more than one site per area may be needed).
T - To determine the extent of regional pollutant transport.
HS - To support special health studies.

[3]**Site Type:**
C - Core SLAMS
S - Non-core SLAMS
P - Special Purpose Monitors

4.0 PM2.5 MONITORING SITES TO BE DEPLOYED IN 1999

The SJVUAPCD is planning to establish two additional PM2.5 monitoring sites in 1999 that would operate FRM monitors. The PM2.5 data from these sites should help to better define representative exposure and satisfy other monitoring objectives of the PM2.5 monitoring network. The SJVUAPCD is also planning to deploy PM2.5 chemical speciation monitors in 1999 as well as continuous PM2.5 monitors.

4.1 Monitoring Sites Operating PM2.5 FRM Monitors

Two additional FRM monitoring sites will be established in 1999. One site will be in southeast Fresno (tentatively call Fresno-"Southeast"). The main purpose of this site will be to determine representative exposure. It is intended at this time to locate it in a predominately residential area. The other site will be in southeast Bakersfield. Like Fresno-"Southeast," it will be located in a predominately residential area. The goal of this site will also be to determine representative exposure. Since these sites are being located with the sole purpose of measuring PM2.5, the SJVUAPCD will be able to use data from these sites to validate the representativeness of the other PM2.5 sites located in these MSAs. Additional information is summarized in Table 4.1.1. In order to make full use of the PM2.5 data collected at these sites, full meteorological monitoring equipment will need to be installed at both sites.

Table 4.1.1 PM2.5 Monitoring Sites to be Deployed in 1999

Site Location	AIRS Site ID	Operating Agency[1]	Spatial Scale	Monitoring Objective[2]	Site Type[3]	Measurement Method
Bakersfield-"Southeast"	New ID	SJV	Neighborhood	R	C	FRM Sequential
Fresno-"Southeast"	New ID	SJV	Neighborhood	R	C	FRM Sequential

[1]**Operating Agency:** ARB - California Air Resources Board
SJV - San Joaquin Valley Unified Air Pollution Control District

[2]**Monitoring Objectives:**
R - To determine representative high concentrations in a populated area.
M - To determine the highest concentration expected to occur in the area covered by the network (more than one site per area may be needed).
T - To determine the extent of regional pollutant transport.
HS - To support special health studies.

[3]**Site Type:**
C - Core SLAMS
S - Non-core SLAMS
P - Special Purpose Monitors

4.2 Chemical Speciation Monitoring

Speciation will be done at two sites within the Fresno and Bakersfield MSAs.[1] The purpose of the speciation is to determine the sources of PM2.5, which will help the SJVUAPCD to develop a further understanding of PM2.5 in the Valley. This information is critical for the development of state implementation plans (SIPs) and computer models. The speciation data can be used to validate emission inventories. Table 4.2.1 summarizes the sites that will include chemical speciation.

Table 4.2.1 PM2.5 Chemical Speciation Monitoring

Site Location	Airs Site ID	Operating Agency*	Monitoring Method
Bakersfield-5558 California Avenue	060290014	ARB	To be determined
Bakersfield-Golden	060290010	SJV	To be determined
Corcoran-Patterson Avenue	060310004	SJV	To be determined
Fresno-1st Street	060190008	ARB	To be determined
Fresno-Clovis	060195001	SJV	To be determined
Merced-"Mid-Town"	New ID	SJV	To be determined
Modesto-I Street	060990002	ARB	To be determined
Stockton-Hazelton Street	060771002	ARB	To be determined
Visalia-N Church Street	061072002	ARB	To be determined

***Operating Agency:** **ARB** - California Air Resources Board
SJV - San Joaquin Valley Unified Air Pollution Control District

4.3 Continuous PM2.5 Monitoring

The SJVUAPCD will locate one PM2.5 continuous monitor in the Fresno MSA and one in the Bakersfield MSA if funding is available. Although these two monitors are not required, they are necessary. Fresno and Bakersfield are both large MSAs with demonstrated PM2.5 problems. By 2001, the Fresno MSA will have a population of over 1 million, while the Bakersfield MSA will be close to 700,000.

[1] EPA has indicated that it wants a speciation monitor located at a PAMS site in each PAMS area. This is because the PM2.5 season on the East Coast overlaps the ozone season and EPA wants to see speciation data on the gaseous and particulate pollutants gathered with each other. The District is agreeing to install a speciation monitor at one PAMS site and the maximum concentration site in each of the two MSAs that are PAMS areas, but believes that the two non-PAMS speciation sites selected in the MSAs are the most appropriate sites.

These monitors will supply temporal data for health studies that cannot be provided by the required instruments and will be useful for supplying information for health studies when a filter instrument is not running. They will provide data on which to base predictions of PSI or health advisories for the public. They will also assist the SJVUAPCD in implementing a smoke management program to limit the impacts of residential wood burning, agricultural burning and prescribed burning on the public. The information regarding these monitors is summarized in Table 4.3.1

Table 4.3.1 Continuous PM2.5 Monitors to be Deployed in 1999

Site Location	AIRS Site ID	Operating Agency
Bakersfield-5558 California Avenue	060290014	ARB
Fresno-1st Street	060190008	ARB

4.4 Other PM2.5 Monitoring

In addition to the PM2.5 monitoring sites described above, the SJVUAPCD and ARB are interested in setting up a "super" monitoring site in the Bakersfield MSA. A "super" site would monitor and measure a broad range of parameters for various pollutants. It will also allow testing of prototype instruments against existing instruments.

5.0 SAMPLING FREQUENCY

The federal requirements call for everyday sampling for PM2.5 at certain core SLAMS and 1 in 3 day sampling at all other PM2.5 sites. As of January 1, 1998, EPA requires all PM10 sites to sample on a 1 in 3 day schedule. In order to collect sufficient data and at the same time conserve monitoring resources, the SJVUAPCD is proposing alternative sampling frequencies for PM2.5 and PM10. With this alternative schedule, the SJVUAPCD believes that it captures all needed data at a significant cost and labor savings by reducing out of season samples. The sampling schedule will be modified as necessary to support the California Regional PM Study and other special studies

5.1 PM2.5 FRM Sampling Frequency

The SJVUAPCD's proposed sampling schedule is summarized in table 5.1.1.

Table 5.1.1 PM2.5 Sampling Frequency

Site Location	Airs ID	Sampling Frequency		
		Required	Proposed Frequency	
			Until 3-31-99	After 4-1-99
Bakersfield-1128 Golden State	060290010	Everyday	1 in 3	1 in 3*
Bakersfield-5558 California Avenue	060290014	Everyday	1 in 3	Everyday
Bakersfield-"Southeast"	New ID	Everyday	1 in 3	1 in 3*
Clovis-N Villa Avenue	060195001	Everyday	1 in 3	1 in 3*
Corcoran-Patterson Avenue	060310004	1 in 3	1 in 3	1 in 3*
Fresno-1st Street	060190008	Everyday	1 in 3	Everyday
Fresno-"Southeast"	New ID	Everyday	1 in 3	1 in 3*
Merced-"Mid-Town"	New ID	1 in 3	1 in 3	1 in 3*
Modesto-I Street	060990002	1 in 3	1 in 3	1 in 3
Stockton-Hazelton Street	060771002	1 in 3	1 in 3	1 in 3
Visalia-N Church Street	061072002	1 in 3	1 in 3	1 in 3

*These stations will monitor once every six days between April and September and once every three days between October and March.

The SJVUAPCD is proposing that all sites will run on a 1 in 3 day schedule from site installation through March, 31, 1999. After March 31, 1999, the schedule in the major MSAs over 500,000 population will be for the monitor designated to be the expected highest concentration monitor to run everyday. The two additional monitors designated to capture the representative concentration in a major MSA will run on a 1 in 6 day schedule for the period of

March 1 until September 30 and 1 in 3 day for the period of October 1 to March 31. This schedule should satisfy the EPA's requirements for capturing peak days and will provide daily data for health studies. The reduction to 1 in 6 day monitoring for these two monitors in the off season is justified, based on non-FRM monitoring (dicot) data collected since 1991 that showed there were no exceedances or near exceedances recorded of the daily standard during the second and third calendar quarter at any of the eight sites in the valley. The highest level measured since 1991 during the second and third calendar quarters was 38 micrograms per cubic meter.

The sampling schedule at one site in each MSA over 200,000 population will run on the EPA recommended schedule of 1 in 3 day from site initiation. The sites in the two smaller areas, Merced and Corcoran, will run 1 in 3 days from October 1 until March 31 and 1 in 6 day from April 1 to September 30 each year.

5.2 PM2.5 FRM Chemical Speciation Sampling Frequency

The required sampling frequency for PM2.5 chemical speciation is 1 in 12 day. In some cases, this sampling frequency may not be sufficient to adequately support SIPs and health studies. The appropriate sampling frequency will be determined in the future and will depend on data needs and available resources.

5.3 PM10 Sampling Frequency

The EPA’s new minimum required sampling frequency for PM10 is 1 in 3 day. The Air Resources Board and the local air pollution control districts in California are requesting that the U.S. EPA Region 9 grant a statewide waiver allowing sampling at the current schedule of 1 in 6 day, with certain exceptions to be determined on a case by case basis. To demonstrate attainment of the national 24-hour PM10 standard, more frequent sampling may be needed. Monitoring sites with maximum 24-hour concentrations close to the 24-hour standard may be required to sample everyday or on a one in three day schedule.